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Earth's Building Blocks - Year 3

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Teaching overview

Year 3 Science | Ten lessons of approximately 60 minutes

UNIT QUESTION

How do the properties of rocks, minerals and soil help us explain and use Earth materials?

LEARNING GOALS

Distinguish rocks, minerals and soil. Observe properties, ask safe questions, make predictions and compare selected samples consistently. Represent observations with labels and units. Use evidence to improve an explanation, justify a material choice and state what a small sample cannot show.

TEACHING ROUTES

Use the ten separate lesson presentations for the full route. An eight-session route is mapped on the next pages; it keeps the practical work and assessment and combines selected slides from Lessons 1–2 and 9–10. These are teaching choices using the supplied files, not extra combined decks.

WHAT IS PROVIDED

Ten editable lesson presentations (10 slides each); an editable nine-question quiz (22 slides, with separate answer slides); two colour displays; eight case/study cards on two pages; a cooperative Evidence Trail game on three pages; two worksheets with matching red-answer companions; two assessment pages and the rubric.

USING THE RESOURCES

D1 and D2 are the displays, Ca/Cr the case cards, G1a–G1c the game, W01–W10 the worksheets and A1 the assessment and the rubric. Each worksheet is immediately followed by its answer companion. Illustrative answers are examples or criteria; actual class observations could differ.

ACCESS AND EXPECTATIONS

Students may speak, point, draw, write, dictate to an adult or use a communication board/device. Offer large images, a vocabulary bank and pre-labelled table headings. Keep the same learning expectations and assess reasoning rather than handwriting or speaking confidence.

Preparation and safe observations

PREPARE BEFORE TEACHING

Select large, clean, teacher-approved rocks on trays. Use the supplied original mineral images instead of unknown mineral handling. Use commercially safe damp soil in securely closed clear plastic trays. Review allergies and individual handling needs; provide an image-based alternative. Prepare hand lenses, rulers, timers, paper and the relevant worksheets.

SOIL-JAR METHOD — ADULT PREPARATION ONLY

Use two identical 250 mL clear plastic screw-lid jars. Add 25 mL of loosely filled soil A and 100 mL water to one; use the same amounts with soil B in the other. Close both securely. Gently invert each 10 times, then start the timer. Keep the measuring method, containers, soil/water amounts, mixing and observation times alike; change the selected soil sample only.

OBSERVE AND RECORD

Students observe closed jars on trays at 2 and 10 minutes. Measure the visible settle layer height in millimetres with a ruler outside the jar. If no edge is clear, write 'not clear' and describe cloudiness or use a labelled drawing. A later timed observation is optional. Do not force a predicted result or infer plant-growing quality from layer height.

CLASSROOM BOUNDARIES

The teacher handles soil, water and lids. Students do not open, shake jars, sniff or taste soil, grind rocks, create dust or use glass, acids or scratch tests. Keep jars away from mouths and eyes. Never collect from protected or cultural places. Wash hands and clean the work area.

EVIDENCE ORIGINS AND SOURCES

Rock and mineral information, the granite example and minerals in use draw on Geoscience Australia's www.ga.gov.au and Australian mineral facts education pages (ga.gov.au). Affected model uses only visible 'Banded' credit. All pictures are original explanatory illustrations; no official source images reproduced. Soil pictures are explanatory models. Path/planter cases are explicitly fictional. Teach the difference between an observation, an inference, a model and a fictional case.

LANGUAGE NOTE

In the path case, 'sound stone' means intact stone suitable for its purpose. It refers to condition, not a noise-making stone.

Eight-session route I

EACH 60-MINUTE SESSION

5 minutes retrieval; 10 minutes modelling; 30 minutes practical/report work; 10 minutes explanation/conference; 5 minutes reflection and cleanup.

1 | Earth materials and rock properties

Use Lesson 01 slides 1–5 to establish distinctions and soil as a mixture. Use Lesson 02 slides 3–7 to model property words, observation/inference and the two-rock practical. Use W01 briefly for a question/prediction and W02 for the comparison. Choose Lesson 02 slides 8–10 for explanation/reflection/closing. Omit the repeated Lesson 01 practical and duplicate openings/closings.

2 | Minerals within rocks

Use Lesson 03 and W03, D1 and case cards 1–2. Compare the labelled granite model with a named mineral example. Keep identification of classroom grains uncertain. Collect labelled model and explanation.

3 | What is in soil

Use Lesson 04 and W04, D2 and case card 3. Inspect closed jars, distinguish visible parts from the explanatory model and explain a mixture. Collect observation-explanatory models.

4 | Compare soils

Use Lesson 05 and W05. The teacher prepares identical closed jars with equal soil/water amounts and mixing; observe and 10 minutes students explain the changed sample and conditions kept alike. Do not 'note down' when appropriate.

PREVIEW

Eight-session route 2

EACH 60-MINUTE SESSION

5 minutes retrieval; 10 minutes modelling; 30 minutes practical/report work; 10 minutes explanation/conference; 5 minutes reflection and cleanup.

5 | Represent observations

Use Lesson 06 and W06. Use class results at one shared time, with millimetres and sample labels. Teach the explicitly illustrative $A = 12 \text{ mm}/B = 20 \text{ mm}$ model separately. A clear table or labelled drawing is valid if a graph cannot represent an unclear edge.

6 | Resources people use

Use Lesson 07 and W07 with case cards 4–6. Link a property to a stated purpose, distinguish fictional/sourced/observed evidence, and identify a missing fact. Use Evidence Trail challenges as a brief consolidation.

7 | Responsible choices

Use Lesson 08 and W08 with case card 7. Compare reuse and new stone for a safe accessible path. Require a linked consequence and a suitability check, not a false claim that the material is always best.

8 | Report, limits and assessment

Open with Lesson 09 slides 1–5. Use W09 for the report/evidence labels and Lesson 10 slides 4–8 for sample limits and a safe next observation using V10 briefly. Complete A1a/A1b through the report and accessible individual conferences, combining earlier W02/W05/W06 evidence. Close with Lesson 10 slides 9–10. Run the quiz as a check or use it during the explanation block; all essential assessment is complete here.

ASSESSMENT IN A LARGE CLASS

Gather short individual responses while students work during the 30-minute task. Combine the conference notes with earlier labelled evidence and the final report. Do not defer students' essential assessment to an extra display session.

Lesson 01 | Earth material questions

PRESENTATION

Earth's Building Blocks - Year 3 - Lesson 01 - Presentation.pptx

LEARNING AND SUCCESS

We can distinguish a rock, a mineral and soil.

We can ask a question that safe observations could answer.

Success: the student gives an explanation linked to the lesson's observation/model and records its origin or relevant limit.

MATERIALS

Large clean rocks; teacher-selected mineral image or original labelled illustration; sealed commercially safe damp soil tray; hand lenses; W01; D1.

TEACHING SEQUENCE — 60 MINUTES

8 min | Retrieve and ask: A rock and soil can both look brown. Does the same colour mean they are the same material? Say what you notice before giving it a name.

12 min | Model and discuss: A rock is a natural solid made from minerals or similar natural material. A mineral is a naturally occurring solid with a particular composition and structure. Soil can contain rock and mineral particles, organic matter, air and water. Organic matter includes material from living things. We cannot see every component in a closed tray.

25 min | Guided then independent practice: 1. Look at a large clean rock, a mineral image and a closed soil tray. 2. Use a hand lens without touching the soil tray. 3. Discuss one visible difference. No tasting, grinding or dust. Model the first comparison/record, then let partners observe and each student contribute an accessible response. Use W01 to draw and label each example. Write or state a question about a visible property. Predict an answer and say why. A prediction may have been made.

10 min | Explain and check: Which example is a mixture with organic matter? How could we safely compare the rock samples? Point to a picture or explain with your own words. Record a brief response or refer to the student's labelled evidence.

5 min | Reflect and clean up: One difference I observed was _____. My question is _____. Clean the table and wash your hands.

SUPPORT

Use the three material pictures and a vocabulary bank. Allow pointing, a communication board/device or dictation to an adult.

EXTENSION

Explain why colour alone cannot establish the material category.

Lesson 02 | Rock properties

PRESENTATION

Earth's Building Blocks - Year 3 - Lesson 02 - Presentation.pptx

LEARNING AND SUCCESS

We can compare rocks using visible properties.

We can improve an explanation when observations change.

Success: the student gives an explanation linked to the lesson's observation/model and records its origin or relevant limit.

MATERIALS

Two large teacher-selected clean rocks per group; trays; hand lenses; W02; C1 cards 1 and 2.

TEACHING SEQUENCE — 60 MINUTES

8 min | Retrieve and ask: Which question did we ask about our rocks? Which part was a prediction? What observation could help us check it?

12 min | Model and discuss: Colour describes what we see. Texture describes surface such as rough or smooth. Grain size describes visible pieces or crystals. A hand lens helps us see small features. Observation: this rock has light and dark grains. Inference: it may contain different minerals. The grain colours alone do not identify the minerals. We can keep some uncertain.

25 min | Guided then independent practical: 1. Compare two large clean rocks on trays. 2. Inspect each with the same hand lens and light. 3. Handling only teacher-approved rocks gently. 4. Keep rocks away from mouths and eyes. Model the first comparison/record, then let partners observe and each student contribute a possible response. Use W02 to record colour, surface texture, grain size. Describe a similarity and a difference. Use a sketch if small grains are hard to describe.

10 min | Evaluate and improve: My first idea was _____. My new observation is _____. Now my explanation is _____. Which words describe evidence rather than a guess? Record a brief response related to the student's labelled evidence.

5 min | Reflect and clean up: An observation that changed my thinking was _____. One feature I still cannot identify is _____.

SUPPORT

Compare one property at a time using rough/smooth and large/small picture choices. Record the student's explanation accurately.

EXTENSION

Compare a third rock and explain why one specimen does not represent every rock.

Lesson 03 | Minerals within rocks

PRESENTATION

Earth's Building Blocks - Year 3 - Lesson 03 - Presentation.pptx

LEARNING AND SUCCESS

We can explain how a rock can contain different minerals.

We can use several observations and keep identification uncertain.

Success: the student gives an explanation linked to the lesson's observation/model and records its origin or relevant limit.

MATERIALS

D1; C1 cards 1 and 2; teacher-viewed Geoscience Australia mineral examples; W03; safe large rock and lens.

TEACHING SEQUENCE — 60 MINUTES

8 min | Retrieve and ask: Does a speckled rock have to be one mineral? Which visible features might give us clues?

12 min | Model and discuss: Granite commonly contains quartz and feldspar, with other minerals such as mica. The different mineral grains form one rock. This example is a model, not identification of your classroom rock. Quartz is a mineral, granite is a rock containing mineral grains. Some rocks mainly contain one mineral, but none can not reliably identify every mineral.

25 min | Guided then independent practical. 1. View the teacher's named mineral example and the granite model. 2. Compare the named grain in the model. 3. Inspect your safe rock for grains. 4. Describe unknown grains without inventing names. Model the first comparison/record then let partners observe and each student contribute an accessible response. 5. 3, link quartz to mineral and granite to rock. Label the model's named grains. Explain how a rock and a mineral are related.

10 min | Probe and check: A student says, "Every white grain is quartz." What can the colour tell us? What does the colour leave uncertain? Record a brief response or refer to the student's labelled evidence.

5 min | Reflect and clean up: A rock can contain _____. A mineral name I can use for the supplied model is _____.

SUPPORT

Use label cards and a partly completed grain drawing. Students may select labels or explain through a communication device.

EXTENSION

Explain why a known labelled model gives more information than an unknown rock's colour.

Lesson 04 | What is in soil

PRESENTATION

Earth's Building Blocks - Year 3 - Lesson 04 - Presentation.pptx

LEARNING AND SUCCESS

We can describe components of soil.

We can separate what we see from what a model tells us.

Success: the student gives an explanation linked to the lesson's observation/model and records its origin or relevant limit.

MATERIALS

Sealed soil trays or original model images; lenses; D2; W04; C1 card 3.

TEACHING SEQUENCE — 60 MINUTES

8 min | Retrieve and ask: Is soil just one kind of rock? What else could be in soil? Which parts might be difficult to see?

12 min | Model and discuss: Rock and mineral particles form part of soil. Organic matter comes from living things. Spaces between particles can contain air and water. Soil tracing shows some parts larger than real size. In a sealed sample we might see grains and small pieces. We cannot see every tiny particle or all the air spaces. The model explains possible components. It does not prove every sample is identical.

25 min | Guided then independent practice: 1. Inspect two closest to learner-selected damp soil trays. 2. Look for visible grains and dirt material. 3. Keep containers closed and dust contained. 4. Use images if allergies or handling is a problem. Model the first comparison/record, then let partners observe. Lead student contribute an accessible response. Use W04 to draw visible components. Label what you visually observe. Mark which components come from the model rather than your observation.

10 min | Explain and check: What evidence answers our soil question? Why could water or air be present even when we cannot see it clearly? Which question could we investigate next? Record a brief response or refer to the student's labelled evidence.

5 min | Reflect and clean up: Soil is a mixture because _____. One thing I cannot tell from this tray is _____.

SUPPORT

Provide mineral particles, organic matter, air and water labels. Allow selecting a label and giving an explanation orally or through a device.

EXTENSION

Explain why a model can help us without showing the exact contents of every real sample.

Lesson 05 | Compare soils

PRESENTATION

Earth's Building Blocks - Year 3 - Lesson 05 - Presentation.pptx

LEARNING AND SUCCESS

We can plan a safe, consistent comparison.

We can measure and record without forcing a predicted result.

Success: the student gives an explanation linked to the lesson's observation/model and records its origin or relevant limit.

MATERIALS

Teacher-selected commercially safe damp samples; two 250 mL identical plastic screw-lid jars; 25 mL measure; 100 mL water measure; tray; timer; millimetre ruler; W05. Follow school risk procedures.

TEACHING SEQUENCE — 60 MINUTES

8 min | Retrieve and ask: Two jars have different soil amounts and different water amounts.

Would their results be easy to compare fairly? What would we keep the same?

12 min | Model and discuss: The teacher uses two identical 250 mL plastic screw-lid jars. Each gets 25 mL of loosely filled soil and 100 mL of water. Use soil and soil 5 to keep the measuring method alike. The teacher closes and gently inverts each jar 10 times. The teacher starts the timer after mixing. Observe at 2 minutes and 10 minutes with jars closed. Use a ruler to measure the visible settled layer in millimetres. Cloudy water or no clear boundary is a valid observation.

25 min | Guided then independent practical: Students observe the closed jars on trays. The teacher handles the soil, water and lids. No tasting, sniffing, opening, shaking by students or glass. Water levels are below the water area. Model the first comparison/record, then let partner observe and each student contribute an accessible response. W05 records what changes, what stays alike and our prediction. Record the visible layer at each time. If no clear edge appears, write "not clear". A later observation is optional and needs its time label.

10 min | Explain and check: What did we change? What stayed alike? Do both jars show a clear layer? Layer height alone does not tell us which soil grows plants best. Record a brief response or refer to the student's labelled evidence.

5 min | Reflect and clean up: Our comparison was more consistent because _____. The result I actually observed was _____.

SUPPORT

Offer an image-based method sequence and a partly completed controls list. Students may direct a partner to record their observation.

EXTENSION

Explain why equal bulk volume does not guarantee equal mineral mass or identical particle mixtures.

Lesson 06 | Represent observations

PRESENTATION

Earth's Building Blocks - Year 3 - Lesson 06 - Presentation.pptx

LEARNING AND SUCCESS

We can organise observations in a labelled table.

We can make a graph or labelled drawing that matches our evidence.

Success: the student gives an explanation linked to the lesson's observation/model and records its origin or relevant limit.

MATERIALS

W05 records; W06; pencils and ruler; closed jars; teacher's illustrative table and graph.

TEACHING SEQUENCE — 60 MINUTES

8 min | Retrieve and ask: Which record shows the actual sample and observation time? Why does a number need a unit? What should we write if the layer edge is unclear?

12 min | Model and discuss: Include the sample label, elapsed time and settled-layer height in mm. For example, "A, 10 minutes, 12 mm". This is illustrative data for learning, not a measured class result. Illustrative example: A = 12 mm and B = 20 mm, 10 minutes. Use equally spaced marks on the vertical axis. Label the axis "Settled-layer height mm". A higher bar represents a greater layer height, not better soil.

25 min | Guided then independent practice: 1. Choose one observation time for comparing your jars. 2. Check the sample label and unit. 3. Enter your actual values on W06. 4. Make a column graph if both edges are measurable. Model the first comparison/record, then let partners observe and contribute an accessible response. Use the blank axes or make a labelled drawing if an edge is unclear. A and B must refer to the same labels as W05. Do not include your own sample in graph.

10 min | Explain and check: Does the graph show the same numbers as the table? Are we comparing the same time? What does the representation help us notice? Record a brief response. Refer to the student's labelled evidence.

5 min | Reflect and clean up: The table or graph helps me explain _____. A limit of my record is _____.

SUPPORT

Supply sample labels, units and a scale. Support drawing, pointing or dictated comparisons while preserving the same evidence demand.

EXTENSION

Check a partner's table-to-graph match and explain how an unclear boundary affects precision.

Lesson 07 | Resources people use

PRESENTATION

Earth's Building Blocks - Year 3 - Lesson 07 - Presentation.pptx

LEARNING AND SUCCESS

We can connect an Earth material's properties to a use.

We can explain how evidence helps people make decisions.

Success: the student gives an explanation linked to the lesson's observation/model and records its origin or relevant limit.

MATERIALS

C1 cards 4–6; W07; actual property records; D2.

TEACHING SEQUENCE — 60 MINUTES

8 min | Retrieve and ask: Why might a gardener and a builder need different materials? Which properties would matter for each purpose?

12 min | Model and discuss: People use rocks and minerals to make useful materials. Some rocks serve as building stone. Minerals can supply materials for manufacturing. Soils support plant growth and provides space for roots. The class needs a planter for seedlings. Sample A has visible plant pieces and crumbly grains. Sample B looks like a hard rock with no visible plant pieces. These fictional clues guide a choice. They do not guarantee plant growth.

25 min | Guided then independent practice: Use Cards 4–5 and W07 with a partner. Match each purpose to a relevant property. Consider two possible choices. Ask what further information would help. Model the first comparison/record, then let partners observe and each student contribute an accessible response. Use W07, record the material, useful property and reason for your choice. Use your sample observations where relevant. Say whether your evidence is observed, modelled or inferred.

10 min | Explain and check: What evidence supports your recommendation? Could the material have a drawback? How might a gardener or builder test the choice safely? Record a brief response or refer to the student's labelled evidence.

5 min | Reflect and clean up: Scientific observations help people _____. Our recommendation has a limit: _____.

SUPPORT

Offer purpose pictures and a sentence starter: "I would use _____ because _____." Accept pointed choices with an evidence explanation.

EXTENSION

Consider durability, water movement or reuse as an extra property and explain what you still need to find out.

Lesson 08 | Responsible choices

PRESENTATION

Earth's Building Blocks - Year 3 - Lesson 08 - Presentation.pptx

LEARNING AND SUCCESS

We can compare the consequences of material choices.

We can use scientific evidence to help solve a practical problem.

Success: the student gives an explanation linked to the lesson's observation/model and records its origin or relevant limit.

MATERIALS

C1 card 7; W08; existing observation portfolio; teacher-confirmed fictional scenario.

TEACHING SEQUENCE — 60 MINUTES

8 min | Retrieve and ask: If a school needs a garden path, should it always buy new stone? Which other information would help us decide?

12 min | Model and discuss: Option A: reuse sound stone already at school. Option B: buy new quarried stone. Both must meet the school's safety and access needs. Inspect condition and suitability before recommending reuse. Extracting new material can disturb land and use energy. Reusing suitable material can reduce the need for new extraction. Extraction forms over long timescales. Our choice must also suit its purpose and safety needs.

25 min | Guided then independent practice. Complete options cards using C1 card 7. Identify a useful property and one consequence for each. Discuss what information is missing. No collection from protected or cultural places. Model the first comparison/record, then let partners observe and discuss. Each student contribute an accessible response. Use W08 to compare the fictional options. Give a reasoned recommendation. Prepare your earlier observation records for reuse.

10 min | Explain and check: Which option do you recommend, and under what condition? How does your evidence address the path problem? What might change your recommendation? Record a brief response or refer to the student's labelled evidence.

5 min | Reflect and clean up: A responsible choice considers _____. One missing fact I would check is _____.

SUPPORT

Read the options separately and supply a property/consequence organiser. Use partner-supported choices without giving the reasoning for the student.

EXTENSION

Explain a situation where buying new stone might be necessary because the reused material is unsuitable.

Lesson 09 | Earth-material report

PRESENTATION

Earth's Building Blocks - Year 3 - Lesson 09 - Presentation.pptx

LEARNING AND SUCCESS

We can compare properties and justify a resource choice.

We can communicate evidence for a teacher or younger class.

Success: the student gives an explanation linked to the lesson's observation/model and records its origin or relevant limit.

MATERIALS

W09; A1 pages 1–2; R1; individual observation portfolio; W10 for compact session 8.

TEACHING SEQUENCE — 60 MINUTES

8 min | Retrieve and ask: Which observation from our portfolio is strongest? Which label or unit would an audience need?

12 min | Model and discuss: Fictional example: "I recommend the crumbly soil for the planter. It has visible organic matter and space between grains. I would still recommend it for plant needs." The reason links a property to the purpose. Include a rock/mineral/soil explanation. Compare two materials using observation. Add a labelled drawing, table or graph. Justify a use and acknowledge a limit.

25 min | Guided then independent practice. Prepare your evidence report using W09 and A1. Use the evidence already gathered to explain the partner before your teacher conference.

Speech, writing, drawing or a communication device can show the same learning. Model the first comparison/recommendation. Let partners observe and each student contribute an accessible response. Identify the origin of each piece of evidence. Use actual class data, or clearly label the supplied fictional example. Keep the sample and time labels consistent.

10 min | Explain and check: Which property supports your choice? How was the comparison safe and consistent? How does science help someone use this information? Record a brief response. Refer to the student's labelled evidence.

5 min | Reflect and clean up: One part of my explanation is well supported because _____. One limit I will tell my audience is _____.

SUPPORT

Use an evidence organiser, labels or a recorded response. The student still identifies the observation and explains the choice.

EXTENSION

Justify an alternative choice for a different purpose and explain why the same evidence can lead to a different decision.

ASSESSMENT

Use A1a/A1b, R1 and earlier work as one portfolio. Record short individual conferences during the task; speech, drawing or supported communication can show the same learning.

Lesson 10 | What else would we test

PRESENTATION

Earth's Building Blocks - Year 3 - Lesson 10 - Presentation.pptx

LEARNING AND SUCCESS

We can state what our small sample set cannot show.

We can suggest a safe next observation and revise an explanation.

Success: the student gives an explanation linked to the lesson's observation/model and records its origin or relevant limit.

MATERIALS

W10; completed A1/portfolio; R1; C1 card 8; no new collection required for this lesson.

TEACHING SEQUENCE — 60 MINUTES

8 min | Retrieve and ask: Does one jar tell us about every soil in Australia? Which claim goes beyond our observations?

12 min | Model and discuss: In our 12/20 mm example, B's layer is taller at 10 mm. "All soils like B are best for every plant" exceeds the evidence. This is an illustrative model; actual class results may differ. We could compare another teacher-selected sample using the same method. Or we could observe the same closed jars at a later bell-ringer time. More relevant evidence can improve an explanation. A proposed test is not a result.

25 min | Guided then independent practice: Use VMO to identify a limitation. Propose one safe observation that addresses it. State what you could keep safe. Explain how the new evidence could affect your recommendation. Model the next comparison/record, then let partners observe and each student contribute an accessible response. Add the limitation and next question to your assessment explanation, give a practical use for the finding. The teacher completes the conference, record findings in your portfolio and response.

10 min | Explain and check: Which is your next observation useful? Which finding might change your explanation? Could a different soil sample give a different result? Record a brief response or refer to the student's labelled evidence.

5 min | Reflect and clean up: I used to think _____. Now the evidence suggests _____. I would investigate _____ safely.

SUPPORT

Offer two relevant next-question choices and let students explain their selection using speech, pictures, gestures or a device.

EXTENSION

Describe how several samples and repeated observations could make a conclusion stronger while still leaving limits.

ASSESSMENT

Use A1a/A1b, R1 and earlier work as one portfolio. Record short individual conferences during the task; speech, drawing or supported communication can show the same learning.

Teaching the Evidence Trail game

SETUP AND PLAY

Use G1a rules, G1b board and G1c challenges with C1a/C1b and D1/D2. Groups of 2–4 point or use a large counter. Read the worked turn, then choose a challenge, move to its linked stop, explain using evidence, ask one respectful question and check the criteria together. There is no timer or speed winner. Aim to give an explanation at each of the six stops: Notice, Ask, Compare, Explain, Apply and Reflect.

TEACHER CHECK CRITERIA

- 1 Notice: Soil is a mixture, including mineral particles and organic matter with air/water between particles. Accept an explanation that does not claim every part is visible.
- 2 Ask: A question about visible rock texture, colour or grains is safe and observable. It must not require grinding, tasting or unknown mineral tests.
- 3 Compare: Quartz is a mineral; granite is a rock containing mineral grains. The supplied model names quartz, feldspar and dark mica.
- 4 Explain: Different minerals can share colours and a mineral may vary in colour; one colour alone leaves identity uncertain.
- 5 Apply: Link a relevant property to a stated purpose. A planter is a simple example of organic matter in crumbly soil, while noting missing water/plant information. Do not infer plant quality from jar layer height.
- 6 Reflect: One selected sample under one method cannot establish all soils, all conditions or best plant growth.
- 7 Compare: Keep jars, soil/water amounts, measuring, mixing and times alike; change only the selected soil sample.
- 8 Apply: Reusing intact suitable soil may reduce demand for extraction. New extraction can disturb land. Either, compensation must check condition and safe accessible use. Accept a well-respected term.

RESPONSE MISCONCEPTIONS

Ask students to distinguish what they observed from what a model, source or fictional case says. Give advice or allow pointing, a drawing or a communication device, then listen for the reasoning. The communication mode does not change the achievement level.

Quiz teaching notes I

USING THE SEPARATE QUIZ

Show one question before revealing its separate answer slide. Read aloud as needed. Students may point, draw, speak, write or use supported communication. Discuss why an answer follows from evidence; use responses to plan reteaching.

1. Is soil just one kind of rock?

Teaching response: No. Soil is a mixture. It can contain rock/mineral particles, organic matter, air and water.

2. Can colour alone reliably identify every mineral?

Teaching response: No. Several properties help. We keep an unknown identity uncertain rather than guessing a name.

3. Quartz and granite: which is a mineral, and which is a rock?

Teaching response: Quartz is a mineral. Granite is a rock that commonly contains several minerals.

4. Which is an observation: “this sample is rough” or “this sample must be granite”?

Teaching response: “This sample is rough” describes an observation. “This sample must be granite” needs more evidence.

5. One jar gets 25 mL soil and another gets 50 mL soil. Which makes our comparison more consistent?

Teaching response: Use the same soil volume, water volume, jars, mixing method and observation times. Change only the selected soil sample.

PREVIEW

Quiz teaching notes 2

USING THE SEPARATE QUIZ

Show one question before revealing its separate answer slide. Read aloud as needed. Students may point, draw, speak, write or use supported communication. Discuss why an answer follows from evidence; use responses to plan reteaching.

6. Illustrative data at 10 minutes: A = 12 mm and B = 20 mm. Which layer is taller, and by how much?

Teaching response: B is taller by 8 mm. This illustrative comparison describes layer height. It does not establish the best soil for plants.

7. Why can one jar not tell us about every soil?

Teaching response: It represents only one selected sample under one method and observation time. Other samples and times may differ.

8. New fictional case: a school reuses sound stone for a path. Give a benefit and a check it still needs.

Teaching response: Reuse can reduce demand for new extraction, meet the porous condition and suitability for a safe, accessible path. Accept another reason linked to the stated case.

9. New fictional case: a soil jar stays cloudy and no new change is clear. What should you record, and what could you do next?

Teaching response: Record "not clear" with the sample label and time. Keep the jar closed. Suggest a later timed observation or another teacher-prepared sample using the same method.

PREVIEW

Assessment and feedback guide

ASSESSMENT EVIDENCE

Use A1a to plan and organise evidence, A1b for explanation and a short individual conference, and R1 to assess the learning. Earlier W02/W05/W06 records and W09/W10 can be attached or referenced; students do not need to recreate a large graph in a small organiser.

WHAT EACH STUDENT MUST SHOW

Distinguish rock, mineral and soil; compare relevant properties/materials; communicate a labelled representation; describe the consistent safe comparison with units/times; use evidence to improve an explanation; justify a resource use; state a sample limit and a safe next observation. The unfamiliar path case checks transfer to a new choice.

CONFERENCE PROMPTS

Which record supports your explanation? What did you observe and what comes from the model or fictional case? What stayed alike in the jar comparison? Why is your property useful for your chosen purpose? What can this evidence not establish? What could you safely prepare or observe next? Record concise evidence during the report talk so the student is assessed within the core route.

APPLY THE RUBRIC

Judge the four criteria independently: understanding; evidence/process; explanation/application; reflection/responsibility. 'Supported/incomplete' describes a gap in demonstrated learning, not the use of communication support. Sound achievement links a relevant property, safe consistent evidence and a grounded claim. Transfer applies learning to a new case, compares at least two sequences or explains a meaningful method limit.

FEEDBACK AND REACHING

State one demonstrated strength and one precise next step. Revisit the model if rocks/minerals are confused; re-model labels/units if the record is unclear; ask for an evidence link if the choice is unsupported; ask a narrower next question if the conclusion overclaims. Students may revise their explanation after feedback.

SOURCE NOTE

Geoscience Australia education pages: Australian gems and Australian mineral facts (ga.gov.au). Source-based statements are paraphrased; illustrations are original.

Earth's Building Blocks: Key Ideas

Our amazing
Earth!

Rock

A natural solid usually made of minerals.



Mineral

A naturally occurring solid with a particular composition and structure.



Soil

A mixture of mineral particles, organic matter, air and water.



Property

A feature we can observe or measure.

We can observe properties such as colour, texture and crystal shape. We can also measure properties such as size, mass and hardness.



Weathering

Rock breaking down or changing at Earth's surface.



Sample

A small part we study.



How We Explain Our Evidence

We can ask a question, look at evidence, use a model and then give an explanation.

1 Question

Is soil just one kind of rock?



The same soil tray for all three panels.

2 Evidence

We see mineral grains and small plant pieces.



Mineral grains
(small pieces of rock)



Small plant pieces
(organic matter)

3 Model and Explanation

original explanatory model

Air in spaces

Water in spaces

Mineral particles
(small pieces of rock)

Organic matter
(small plant pieces)



Explanation

Soil is a mixture of mineral particles, organic matter, air and water.



Some parts cannot be seen in our sample.

Case and Source Cards 1–4

Cut out the cards. Use them to explore rocks, minerals, soil and how materials are used.

1

Granite

A rock can contain different mineral grains.

Original illustrated model



Quartz

Feldspar

Dark mica

Based on: Geoscience Australia, Australian gems (ga.gov.au).

2

Quartz

Quartz is a mineral.
Colour alone cannot identify every mineral.

Original illustrated examples



Clear quartz

Purple quartz

Yellow quartz

Pink quartz

Smoky quartz

Milky quartz

Based on: Geoscience Australia, Australian gems (ga.gov.au).

3

Soil

Soil can contain mineral particles, organic matter, air and water.

What can we see in a closed tray?

Original explanatory model



Mineral particles



Organic matter



Air



Water

4

Building stone

A school needs a firm path.
Which properties would matter?

Fictional case



Case and Source Cards 5-8

Small questions lead to big ideas!

Cut out the cards. Read each case. Think about the question.

5

Planter

Fictional case

A student has a soil sample for a planter. The soil is crumbly and has visible plant pieces, such as small leaves and bits of wood.



How could this soil help seedlings?

6

Sand sample

Fictional case

A student has a sand sample. The grains are loose and there are no visible plant pieces.



What else do we need to know before choosing this for a planter?

7

Reuse

Fictional case

Students need stones for a safe path at school. They can reuse sound stones from an old path, or buy new stones.



Compare one consequence of reusing sound stones with one consequence of buying new stones.

8

Sample limit

Fictional case

A teacher prepares a soil sample in a closed plastic jar of water. After 10 minutes, the water is still cloudy.



10 minutes
Still cloudy

Does this result tell us about every soil? Why or why not?



Evidence Trail: Rules



- 1** Choose a challenge card.



- 2** Move a large counter or point to its stop.



- 3** Explain using a case card or your observation.



- 4** Ask one respectful question.



- 5** Check the teacher criteria together.

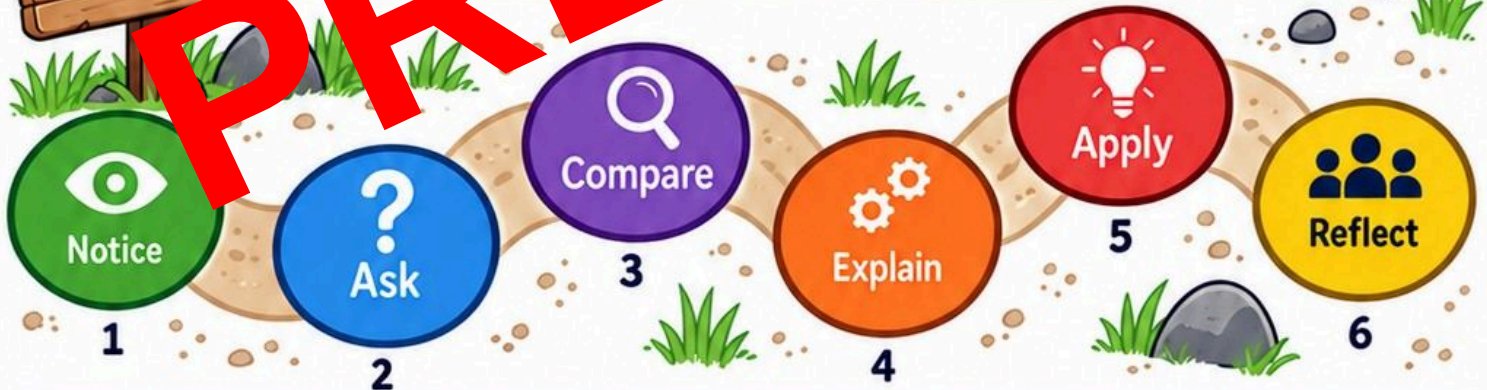


Everyone may speak, point, draw or use a communication device.

Not time and not winning based on speed.



Cooperative aim:
Explain at all six stops.



Worked turn:

Card 1
at Notice



Soil is a mixture because it can contain mineral grains and organic matter, with air and water between particles.



Evidence Trail: Board



1. Place a counter or point on the stop.



2. Choose and complete the linked challenge.



3. Explain your ideas and ask a respectful question.



4. Check the teacher criteria.



1

NOTICE

Challenge:

Look closely at an earth material (e.g. a rock, soil or sand). What do you notice?

Teacher criteria:

- ☐ Clear
- ☐ Relevant
- ☐ Complete



2

ASK

Challenge:

Write a question about the earth material. What would you like to find out?

Teacher criteria:

- ☐ Clear
- ☐ Relevant
- ☐ Complete



3

COMPARE

Challenge:

Compare two earth materials. How are they the same? How are they different?

Teacher criteria:

- ☐ Clear
- ☐ Relevant
- ☐ Complete



EXPLAIN

Challenge:

Use what you have noticed and compared to explain why the earth material might be useful.

Teacher criteria:

- ☐ Clear
- ☐ Relevant
- ☐ Complete



5

APPLY

Challenge:

Think of a real-life use for the earth material. How could it be used by students?

Teacher criteria:

- ☐ Clear
- ☐ Relevant
- ☐ Complete



6

REFLECT

Challenge:

What did you learn? What would you like to investigate next?

Teacher criteria:

- ☐ Clear
- ☐ Relevant
- ☐ Complete

Observe
Ask questions
Find evidence
Make a difference!



Evidence Trail: Challenges

Use the case cards, displays or your observations.

Look
Think
Ask
Find evidence

1 NOTICE

Is soil just one kind of rock?



2 ASK

Ask a safe question about rock properties.



3 COMPARE

Quartz and granite: how are they related?



4 EXPLAIN

Why can colour alone not identify every mineral?



5 APPLY

Choose one property for a garden soil and explain its use.



6 REFLECT

What can one sample not tell us?



7 COMPARE

What stays alike in our soil-jar comparison?



8 APPLY

Reuse sound stone or buy new stone: give a consequence and a safety check.

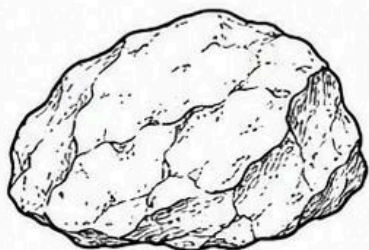


Rocks and soil help us explore, build and grow a brighter future.

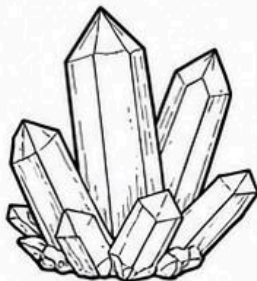
Name: _____

Earth material questions

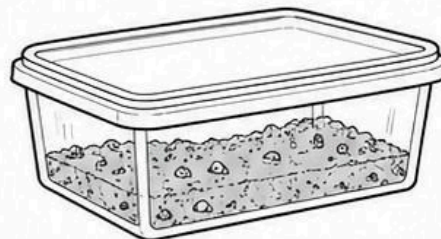
Look at a rock, mineral example and closed soil tray.



Rock



Mineral



Soil

PREVIEW

PREVIEW

PREVIEW

One difference I notice:

My safe question:

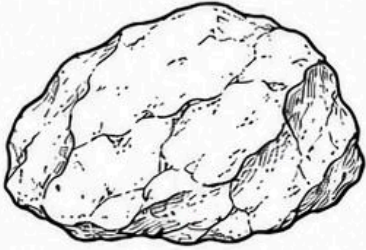
My prediction and reason:

You may draw, point, dictate or write.

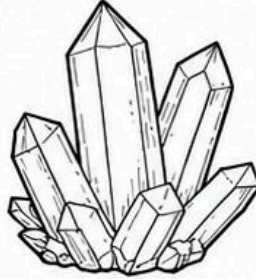
Name: **ANSWERS**

Earth material questions

Look at a rock, mineral example and closed soil tray.



Rock



Mineral



Soil

Illustrative only:

A natural, solid material. It looks hard and has visible grains or crystals.

Illustrative only:

A quartz crystal. It is a natural solid mineral with clear, shiny crystals and a fixed shape.

Illustrative only:

A mixture of different materials such as small rock pieces, sand, clay, humus and plant pieces.

One difference I notice:

Soil can contain plant pieces.

My safe question:

Which rock has larger visible grains?

My prediction and reason:

Rock A may have larger grains because I can see them.

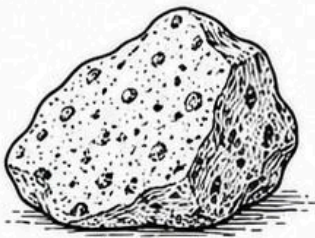
This is a sample response.

You may draw, point, dictate or write.

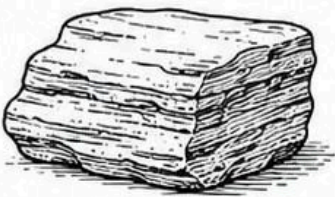
Rock properties

Name: _____

Observe two teacher-approved rocks.



Rock A



Rock B

Property	Rock A	Rock B
Colour		
Surface texture		
Visible grain size		

One similarity:

One difference:

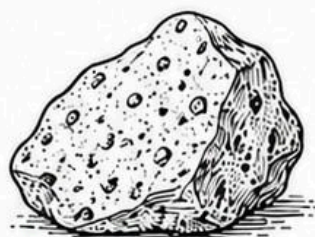
My first idea: _____

My observation changed or supported it because:

Rock properties

Name: **ANSWERS**

Observe two teacher-approved rocks.



Rock A



Rock B

Property	Rock A	Rock B
Colour	Grey (illustrative only)	Dark grey (illustrative only)
Surface texture	Rough (illustrative only)	Smooth (illustrative only)
Visible grain size	Large grains (illustrative only)	Fine grains (illustrative only)

One similarity:

Both are solid rocks.

One difference:

They have a different visible grain size.

My first idea: **The same colour means they are the same rock.**

My observation changed or supported it because:

Their surface texture and visible grains differ. Colour alone does not identify them.

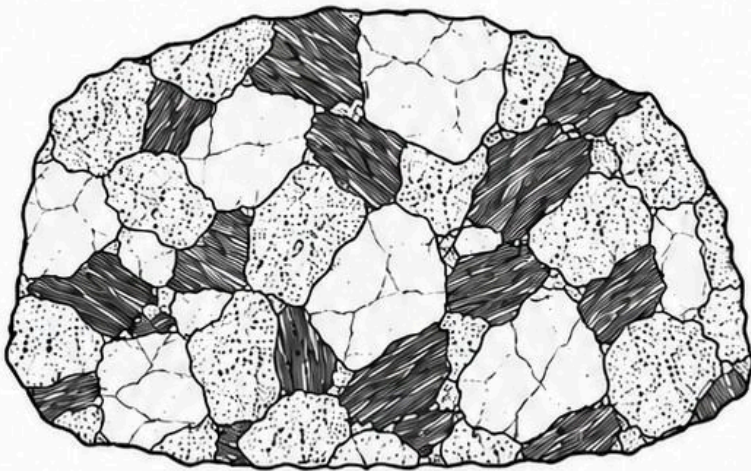
Actual class records may differ.

Minerals within rocks

Name: _____

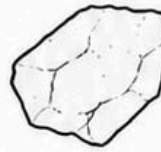
Rocks are made from minerals. Different minerals can be seen as grains in a rock.

Model: granite grain model

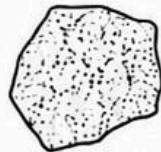


A model of granite showing different mineral grains.

Key



Quartz



Feldspar



Dark mica

Quartz — Mineral or Rock? _____

Granite — Mineral or Rock? _____

Draw and label two mineral grains inside one rock

PREVIEW

A rock can contain _____.

Colour alone cannot identify every mineral because _____

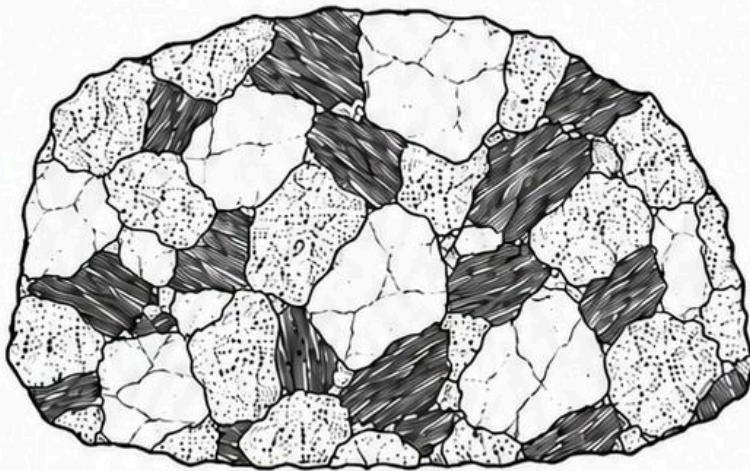
_____.

Minerals within rocks

Name: ANSWERS

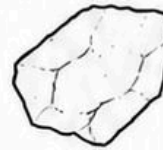
Rocks are made from minerals. Different minerals can be seen as grains in a rock.

Model: granite grain model

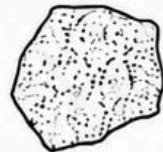


A model of granite showing different mineral grains.

Key



Quartz



Feldspar



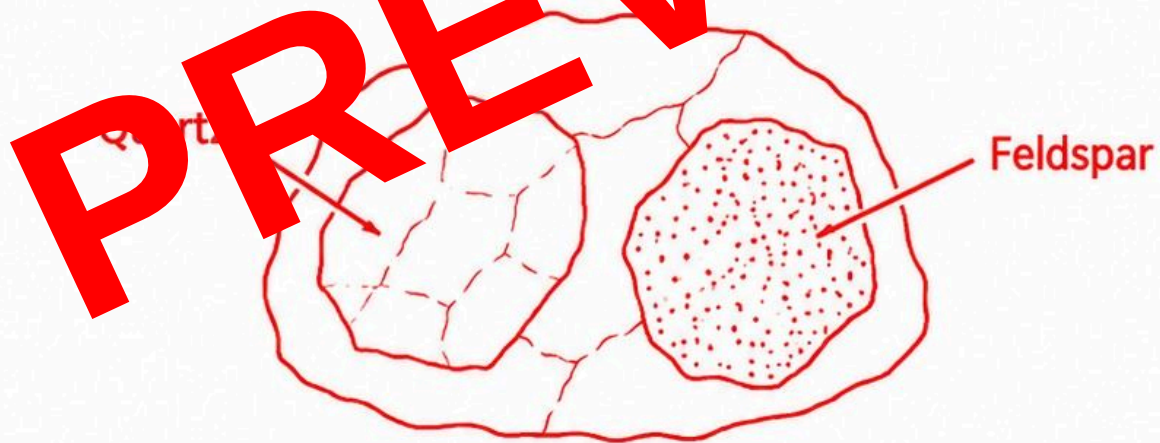
Dark mica

Quartz — Mineral or Rock? Mineral

Granite — Mineral or Rock? Rock

Draw and label two mineral grains inside one rock

Illustrative model



A rock can contain different minerals.

Colour alone cannot identify every mineral because different minerals can share colours

What is in soil?

Name: _____

Word bank:

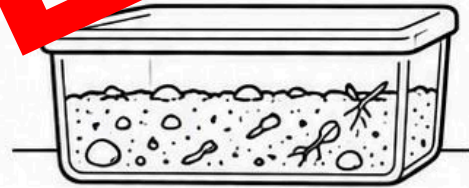
mineral particles

organic matter

air

water

Draw what you observe in a closed soil tray. Label your observed parts.

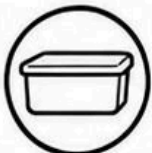


Parts I observed:

Parts the model explains:

Soil is a mixture because _____

_____.



Keep the tray closed.



Wash hands.

What is in soil?

Name: **ANSWERS**

Word bank:

mineral particles

organic matter

air

water

Draw what you observe in a closed soil tray. Label your observed parts.

Illustrative example (your observations may be different):



Parts I observed:

- small rocks or grains
- pieces of dead plants (leaves, twigs)
- dark-looking particles (identity uncertain)

Parts the model explains:

- air (in the spaces between particles)
- water (in the spaces between particles)
- mineral particles and organic matter

Soil is a mixture because it includes mineral particles, organic matter, air and water.
It has several different components.



Keep the tray closed.

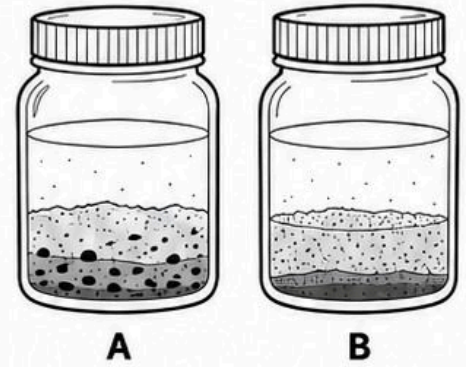


Wash hands.

Compare soils

Name: _____

My question and prediction:



What changes? _____

What stays alike?

Adult method: 25 mL soil + 100 mL water in each identical closed jar;
10 gentle inversions.

Sample	At 2 min (mm)	At 10 min (mm)	What else I notice
A			
B			

If no layer edge is clear, record "not clear".

Our comparison is consistent because

Teacher handles jars; students observe.

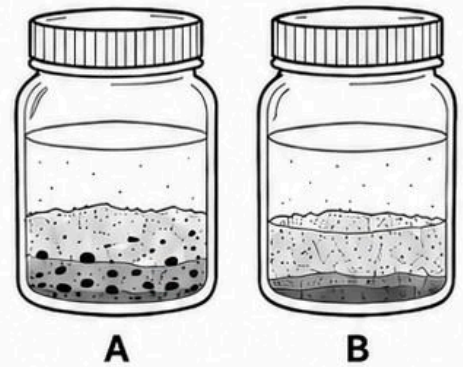
Compare soils

Name: ANSWERS

My question and prediction:

Do A and B form different visible layers at the same time?

Prediction only: they may form different layers.



What changes? The selected soil sample: A or B.

What stays alike? Same volume of soil and water, same jars, same 10 gentle inversions, same timing.

Adult method: 25 mL soil + 100 mL water in each identical closed jar;
10 gentle inversions.

Sample	At 2 min (mm)	At 10 min (mm)	What else I notice
A	Record actual result, or not clear.	Record actual result, or not clear.	Record actual result, or not clear.
B	Record actual result, or not clear.	Record actual result, or not clear.	Record actual result, or not clear.

If no layer edge is clear, record “not clear”.

Our comparison is consistent because

We kept the same volume, jars, water, inversions and timing.

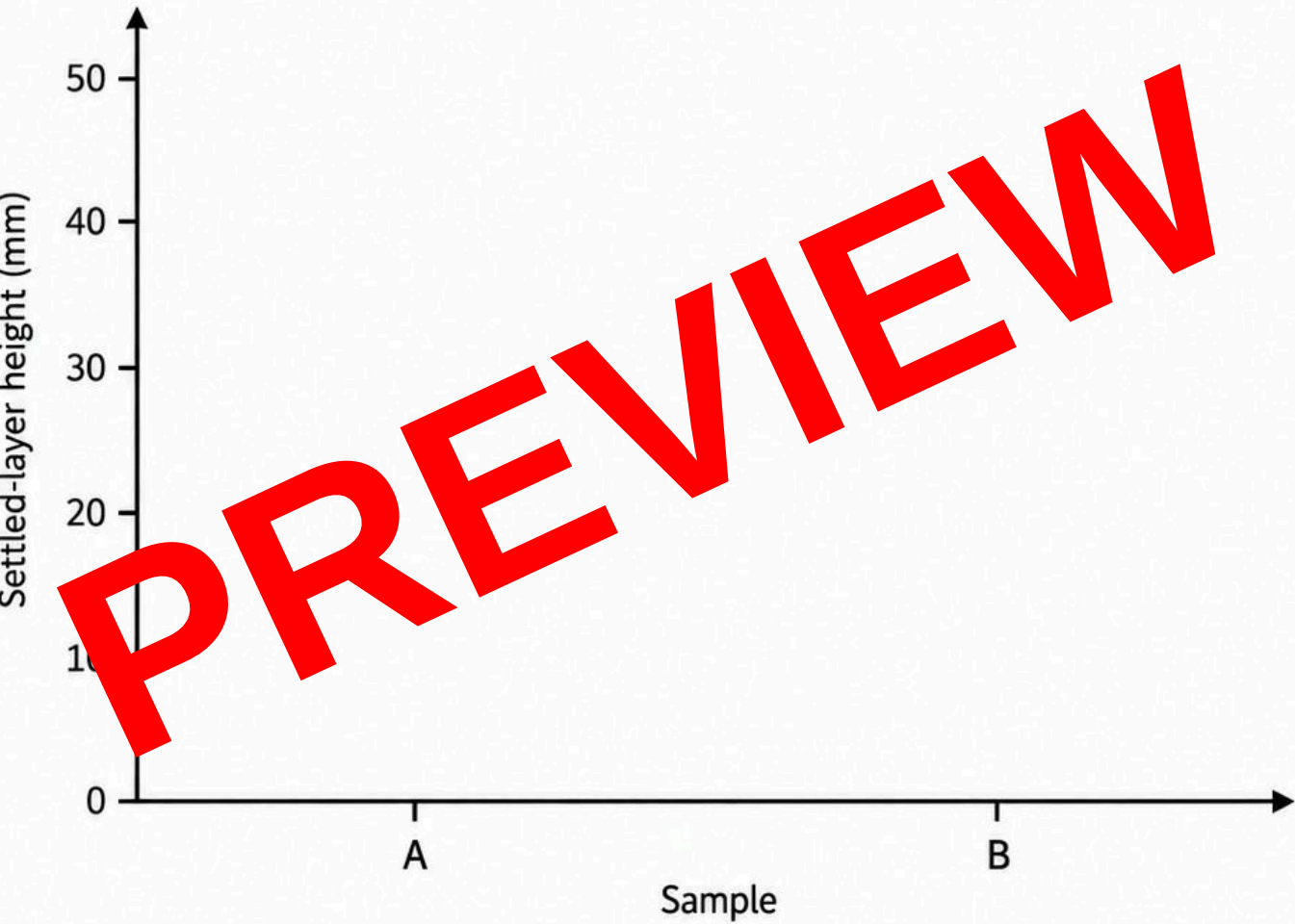
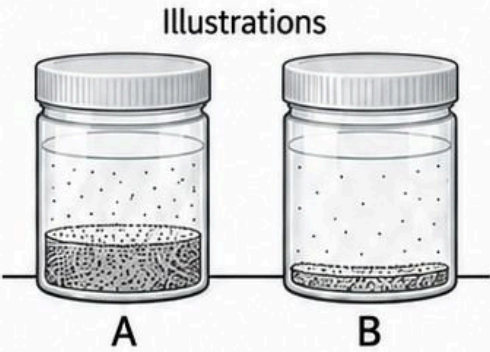
Teacher handles jars; students observe.

Represent observations

Name: _____

Choose the same observation time: ____ minutes.

Sample	Layer height (mm)
A	
B	



My representation shows _____.

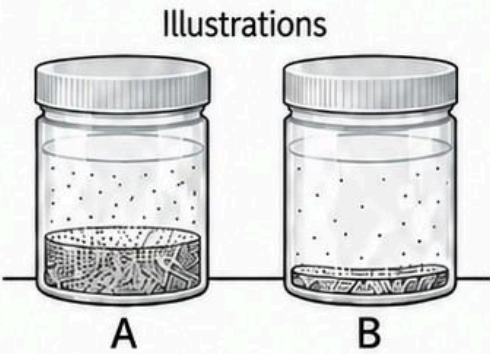
If the edge is unclear, use a labeled drawing instead.

Represent observations

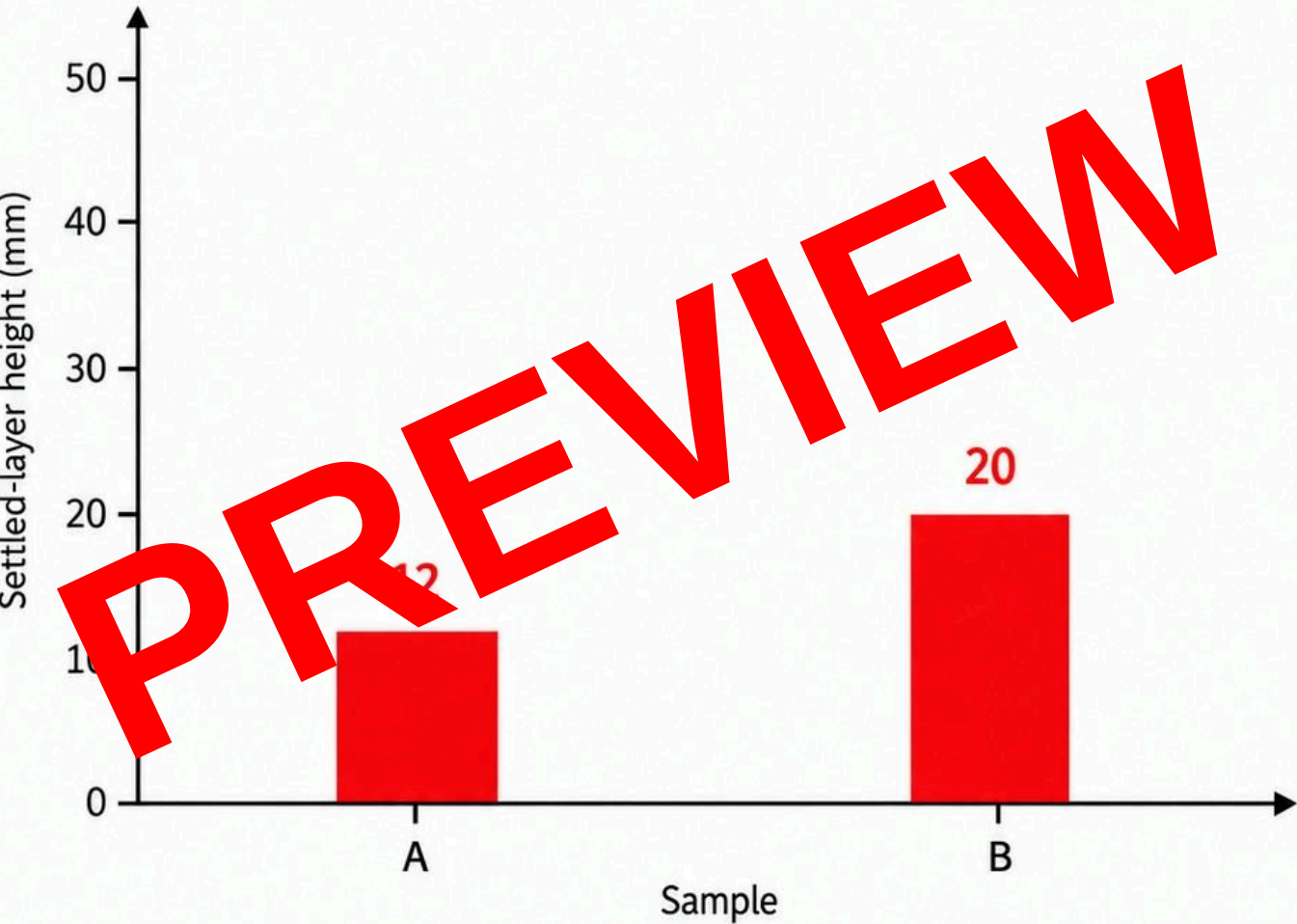
Name: ANSWERS

Choose the same observation time: 10 minutes.

Sample	Layer height (mm)
A	12
B	20



Illustrative only



My representation shows B is 8 mm taller in this model.

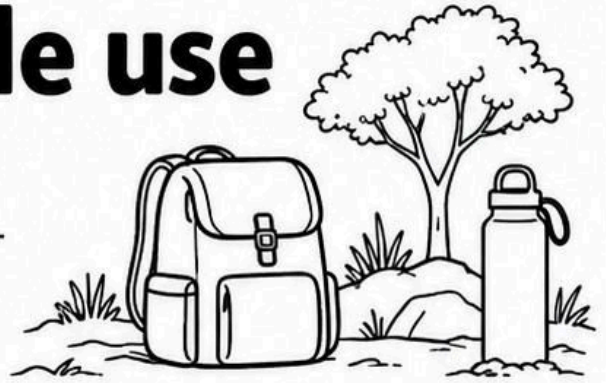
If the edge is unclear, use a labeled drawing instead.

Illustrative values, not class results. Layer height does not show best soil for plants.

Resources people use

Name: _____

Use case cards 4–6 and your observations.



Purpose	Material	Useful property	Why it helps

PREVIEW

My evidence is (circle): observed sourced fictional

I recommend _____ because _____.

_____.

A drawback or missing fact is _____.

_____.

Resources people use

Name: ANSWERS

Use case cards 4–6 and your observations.



Purpose	Material	Useful property	Why it helps
Fictional examples Safe path	Intact stone	Firm surface	Supports walking if suitable.
Planter	Crumbly soil	Visible plant feet	Need add organic matter; check plant and water needs.
Planter comparison	Loose sand	Loose visible grains	Compare water behaviour before choosing.

My evidence is (circle): observed sourced fictional

I recommend intact stone for a path because a firm surface
can support walking if it is safe and accessible.

A drawback or missing fact is the condition of the stone and
whether the surface meets access needs.

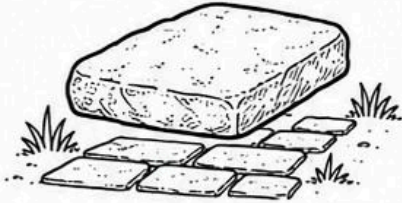
Responsible choices

Name: _____

Read the situation below. Then compare the two choices and complete the organiser.

Fictional case: A school needs stone for a safe, accessible path.
Sound stone means stone that is intact and suitable for the path.

A. Reuse sound stone



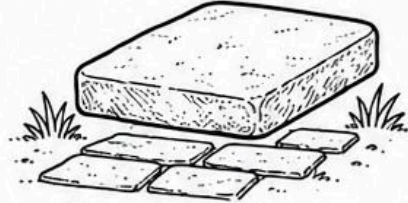
Reuse intact stone that is already available.

Useful property

Consequence

Missing information

B. Buy new stone



Buy suitable new stone from a supplier.

Useful property

Consequence

Missing information

Recommendation and reason: _____

I would check _____
before deciding. _____



Never collect from protected or cultural places.

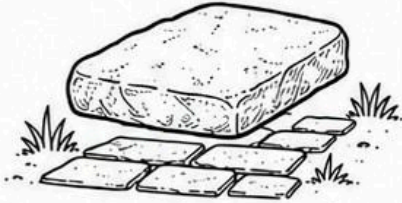
Responsible choices

Name: **ANSWERS**

Read the situation below. Then compare the two choices and complete the organiser.

Fictional case: A school needs stone for a safe, accessible path.
Sound stone means stone that is intact and suitable for the path.

A. Reuse sound stone



Reuse intact stone that is already available.

Useful property

Intact stone can make a firm surface.

Consequence

Reusing suitable stone reduces new extraction.

Missing information

Is it undamaged and suitable for safe access?

B. Buy new stone



Buy suitable new stone from a supplier.

Useful property

Suitable new stone can make a firm surface.

Consequence

New extraction can disturb land.

Missing information

What is its source, condition and suitability?

Recommendation and reason: Reuse intact stone if it meets the path's safety and access needs. New stone may be needed if the reused stone is unsuitable.

I would check condition, surface and access needs
before deciding. _____



Never collect from protected or cultural places.

Earth-material report

Name: _____ Audience: _____ Purpose: _____

Compare two materials. Look closely, think about their properties and record your ideas.

Compare two Earth materials: draw or make a table. Label samples and properties.

My useful material choice and property:

Evidence origin:

- ☐ observed
☐ sourced
☐ fictional

Evidence supporting my choice:

Evidence origin:

- ☐ observed
☐ sourced
☐ fictional

A limit or missing fact:

Evidence origin:

- ☐ observed
☐ sourced
☐ fictional

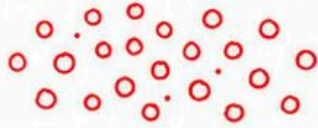
You may use speech, drawing, writing or a communication device.

Earth-material report

Name: ANSWERS Audience: Teacher Purpose: Suggest a planter material

Compare two materials. Look closely, think about their properties and record your ideas.

Compare two Earth materials: draw or make a table. Label samples and properties.

Fictional comparison	
Crumbly soil	Loose sand
 Visible plant pieces	 No visible plant pieces in this case
 Crumbly particles	 Loose grains

My useful material choice and property:

Crumbly soil is a possible planter material.

Visible plant pieces suggest organic matter.

Evidence origin:

☐ observed

☐ sourced

☒ fictional

Evidence supporting my choice:

In this fictional case, the soil is crumbly and has
visible plant pieces; the sand has loose grains.

Evidence origin:

☐ observed

☐ sourced

☒ fictional

A limit or missing fact:

These features do not prove which grows plants best.

We need water-behaviour and plant-needs evidence.

Evidence origin:

☐ observed

☐ sourced

☒ fictional

You may use speech, drawing, writing or a communication device.

What else would we test?



Name: _____

My claim from our small sample set:



What my evidence cannot show:

A safe next observation:

What would keep alike:

How it could change my explanation:

A proposed observation is not a result.

PREVIEW

What else would we test?



Name: **ANSWERS**

My claim from our small sample set:

Illustrative example: our selected samples may differ under the same method. Use actual observations for a class claim.



What my evidence cannot show:

One small sample set cannot describe all soils or show which soil grows plants best.

A safe next observation:

An adult prepares and uses a closed plastic soil jar, then we observe it at the same time.

What would keep alike:

Jar type, 25 mL soil, 100 mL water, 10 gentle inversions and observation times.

How it could change my explanation:

Different observations could revise our explanation or material recommendation.

A proposed observation is not a result.

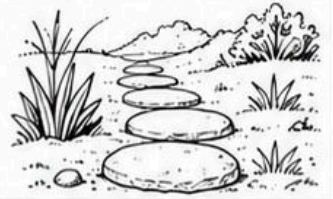
Assessment: Evidence and Plan

Name: _____

Task: Compare Earth materials and justify a useful material choice. Use your *earlier evidence*.

You must show:

1. How rocks, minerals and soil differ.
2. A comparison of two properties/materials.
3. A labelled drawing, table or graph.
4. A justified resource use.
5. A limit and safe next observation.



Rock, Mineral or Soil?

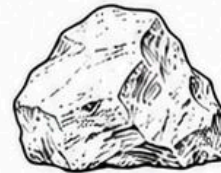
Explain how rocks, minerals and soil are different. Write about each one.

Rock: _____

Mineral: _____

Soil: _____

They are different because: _____



Rock



Mineral



Soil

Evidence organiser

Complete the table. You can also add a drawing, table or graph in the last column.

Sample / material (e.g. rock, mineral, soil or a specific name)	Property (e.g. colour, surface texture, visible grains, etc.)	Evidence collected in (e.g. my test, my observation, a trusted source)	Drawing / table / graph (label clearly)

Justify a useful material use

Choose one material and explain why it is useful for a real purpose.

Limit and safe next observation

What is a limit of your evidence?

What could you observe next to find out more?

Use the way that works best for you to complete this assessment.



Speech



Drawing



Writing



A communication device



Or dictation to an adult

You can also add extra notes or drawings if you need to.

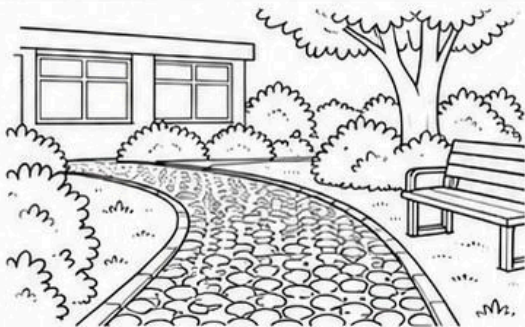
Assessment: Explanation and Conference

Name: _____

New fictional situation

A school can reuse sound stone or buy new stone for a path.

Explain a useful property of the stone, one consequence of using it, and a safety or suitability check that could be done before it is used.



Your explanation

1. _____
2. _____
3. _____
4. _____
5. _____

My material choice and reason:

My evidence and limit:

Safe next observation:

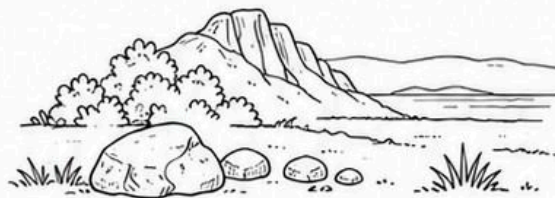
Teacher conference checklist

Evidence notes (complete during the conference)

Criteria	Observed	Evidence notes
Distinction	☐	
Property comparison/representation	☐	
Safe consistent method and units	☐	
Evidence improves explanation	☐	
Useful application	☐	
Sample limit/next question	☐	
Clear communication	☐	

Rubric: Earth's Building Blocks

Name: _____



1. Understanding

Distinguishes rocks, minerals and soil.



☐ Supported/incomplete

Rock, mineral or soil is confused.

☐ Sound

Distinguishes them and describes relevant properties.

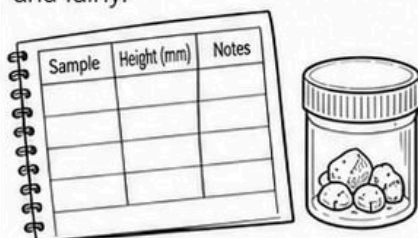
☐ Transfer

Applies the distinction accurately to a new case.

Student notes:

2. Evidence/process

Records and compares safely and fairly.



☐ Supported/incomplete

Record or method has a key gap.

☐ Sound

Safe and consistent comparison, with labels and units.

☐ Transfer

Explains why it is fair and consistent method used.

Student notes:

3. Explanation/application

Uses evidence to make a choice about a real situation.



☐ Supported/incomplete

Choice lacks linked evidence.

☐ Sound

A property supports a useful choice.

☐ Transfer

Compares alternatives and consequences.

Student notes:

4. Reflection/responsibility

Considers limits and next steps.



☐ Supported/incomplete

Conclusion overclaims or next step is unrelated.

☐ Sound

States a sample limit and a safe next question.

☐ Transfer

Explains how new evidence may revise a choice.

Student notes:

Assess learning, not handwriting or speaking confidence.
A communication support does not lower achievement.

Evidence notes: _____

Earth's Building Blocks

Lesson 01: Earth Material

Questions

PREVIEW



Learning focus

We can distinguish a rock, a mineral and soil

We can ask a question that safe observation could answer.

PREVIEW

Our starting question

A rock and soil can both look brown.

Does the same colour mean they are the same material?

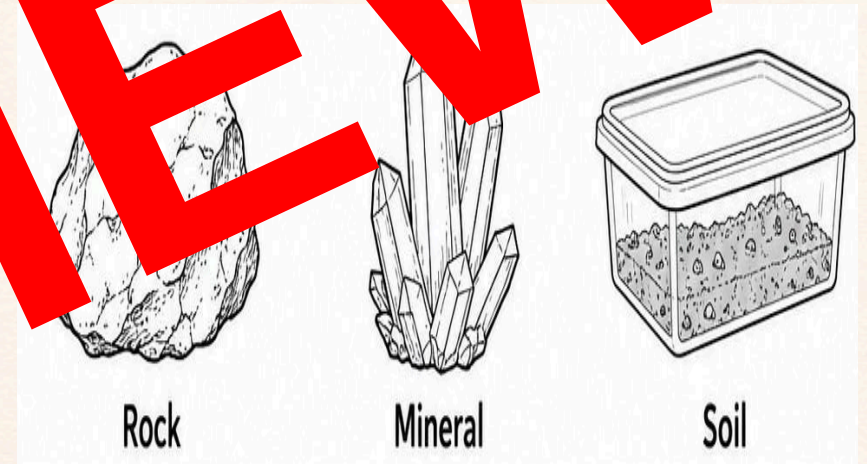
Say what you notice before giving it a name.

PREVIEW

Three related materials

A rock is a natural solid made from minerals or similar natural material.

A mineral is a naturally occurring solid with a particular composition and structure.



Based on: Geoscience Australia, Australian gems (ga.gov.au)

Soil is a mixture

Soil can contain rock and mineral particles, organic matter, air and water.

Organic matter includes material from living things.

We cannot see every component in a closed tray.

PREVIEW

Our practical task

1. Look at a large clean rock, a mineral image and a coloured tray.
2. Use a hand lens without opening the soil tray.
3. Discuss one visible difference. No testing, grinding or dust.

PREVIEW

Our evidence record

Use W01 to draw and label each example.

Write or dictate a question about a visible property.

Predict an answer and say why. A prediction may change.

PREVIEW

Explanation check

Which example is a mixture with organic matter?

How could we safely compare the rock samples?

Point to a picture or explain with your own words.

PREVIEW

Reflection

One difference I observed was ____.

My question is ____.

Clean the table and wash your hands

PREVIEW

Well Done!

PREVIEW



Earth's Building Blocks

Lesson 12: Rock properties

PREVIEW



Learning focus

We can compare rocks using visible properties.

We can improve an explanation when observations change.

PREVIEW

Our starting question

Which question did we ask about our rocks?

Which part was a prediction?

What observation could help us check it?

PREVIEW

Useful property words

Colour describes what we see.

Texture describes a surface, such as rough or smooth.

Grain size describes visible pieces or crystals.

A hand lens helps see small features.

PREVIEW

Observation and inference

Observation: this rock has light and dark grains.

Inference: it may contain different minerals.

The grain colours alone do not identify the minerals.

We can keep a note of our observations.

Based on: Geoscience Australia, Australian gems (ga.gov.au)

Our practical task

1. Compare two large clean rocks on trays.
2. Inspect each with the same hand lens and light.
3. Handle only teacher-approved rocks gently.
4. Keep rocks away from mouths and eyes.

PREVIEW

Our evidence record

Use W02 to record colour, surface texture and visible grain size.

Describe a similarity and a difference.

Use a sketch if small grains are hard to describe.

PREVIEW

Explanation check

My first idea was ____.

My new observation is ____.

Now my explanation is ____.

Which words describe evidence rather than a guess?

PREVIEW

Reflection

An observation that changed my thinking was _____.

One feature I still cannot identify is _____.

PREVIEW

PREVIEW

Well Done!



Earth's Building Blocks

Lesson 08: Minerals within rocks

PREVIEW



Learning focus

We can explain how a rock can contain different minerals.

We can use several observations and make a classification
uncertain.

PREVIEW

Our starting question

Does a speckled rock have to be one mineral?

Which visible features might give us a clue?

PREVIEW

A granite model

Granite commonly contains several minerals.

Quartz and feldspar are common examples.

Dark grains may include mica.

This is an original laboratory model.



Based on: Geoscience Australia, Australian gems (ga.gov.au)

A mineral and a rock

Quartz is a mineral.

Granite is a rock containing mineral grains.

Some rocks mainly contain one mineral.

Colour alone cannot reliably identify every mineral.

Based on: Geoscience Australia, Australian gems (ga.gov.au)

Our practical task

1. View the teacher's named mineral example and use grain identification model.
2. Compare the named grains in the model.
3. Inspect your safe rock for grains.
4. Describe unknown grains without inventing names.

PREVIEW

Our evidence record

On W03, match quartz to mineral and granite to rock.

Label the model's named grains.

Explain how a rock and a mineral are related.

PREVIEW

Explanation check

A student says, “Every white grain is quartz.”

What can the colour tell us?

What does the colour leave uncertain?

PREVIEW

Reflection

A rock can contain ____.

A mineral name I can use for the supplied minerals is ____.

PREVIEW

PREVIEW

Well Done!



Earth's Building Blocks

Lesson 04: What is in soil

PREVIEW



Learning focus

We can describe components of soil.

We can separate what we see from what a model tells us.

PREVIEW

Our starting question

Is soil just one kind of rock?

What else could be in soil?

Which parts might be difficult to see?

PREVIEW

Soil components

Rock and mineral particles form part of soil

Organic matter comes from living things

Spaces between particles can contain air and water.

A soil drawing shows some parts larger than real size.

PREVIEW

Visible evidence and limits

In a sealed sample we might see grains and small plant pieces.

We cannot see every tiny particle or all the air spaces.

The model explains possible components. It does not prove every sample is identical.



Our practical task

1. Inspect two closed teacher-selected damp soil trays.
2. Look for visible grains and plant material.
3. Keep containers closed and dust contained.
4. Use images if allergies or handling risks apply.

PREVIEW

Our evidence record

Use W04 to draw visible components.

Label what you actually observe.

Mark which components come from the model rather than your observation.

PREVIEW

Explanation check

What evidence answers our soil question?

Why could water or air be present even when we cannot see it clearly?

Which question could we investigate next?

PREVIEW

Reflection

Soil is a mixture because ____.

One thing I cannot tell from this tray is ____.

PREVIEW

Well Done!

PREVIEW



Earth's Building Blocks

Lesson 05: Compare soils

PREVIEW



Learning focus

We can plan a safe, consistent comparison

We can measure and record without knowing predicted result.

PREVIEW

Our starting question

Two jars have different soil amounts and different water amounts.

Would their results be easy to compare fairly?

What would we keep the same?

PREVIEW

Our comparison method

The teacher uses two identical clear plastic screw-lid jars.

Each gets 25 mL of loosely filled soil and 100 mL of water.

Use soil A and soil B. Keep the measuring method alike.

The teacher closes and gently inverts each jar 10 times.

PREVIEW

Timing and measurement

The teacher starts the timer after mixing.

Observe at 2 minutes and 10 minutes, with jar closed.

Use a ruler to measure the visible settled layer in millimetres.

Cloudy water or no clear boundary is a valid observation.

PREVIEW

Our practical task

Students observe the closed jars on trays.

The teacher handles the soil, water and seeds.

No tasting, sniffing, opening, shaking by students or glass.

Wash hands and clean the work area.

PREVIEW

Our evidence record

W05 records what changes, what stays alike and our perception.

Record the visible layer at each time.

If no clear edge appears, write "not clear".

A later observation is optional and needs its time label.

PREVIEW

Explanation check

What did we change? What stayed alike?

Do both jars show a clear layer?

Layer height alone does not tell us which soil grows plants best.

PREVIEW

Reflection

Our comparison was more consistent because ____.

The result I actually observed was ____.

PREVIEW

PREVIEW

Well Done!



Earth's Building Blocks

Lesson 06 Represent observations

PREVIEW



Learning focus

We can organise observations in a labelled table.

We can make a graph or labelled drawing that matches our evidence.

PREVIEW

Our starting question

Which record shows the actual sample and observation time?

Why does a number need a unit?

What should we write if the layer edge is unclear?

PREVIEW

A labelled table

Include the sample label, elapsed time and set-up time in mm.

For example, “A, 10 minutes, 12 mm”.

This is illustrative only for learning, not a measured class result.

PREVIEW

A simple column graph

Illustrative example: A = 12 mm and B = 20 mm at 10 minutes

Use equally spaced marks on the vertical axis

Label the axis "Settled-layer height (mm)"

A higher bar represents a greater layer height, not better soil.

PREVIEW

Our practical task

1. Choose one observation time for comparing your groups
2. Check the sample labels and units
3. Enter your actual values in W 6.
4. Make a column graph if both edges are measurable.

PREVIEW

Our evidence record

Use the blank axes or make a labelled drawing if an image is unclear.

A and B must refer to the same labels as V05.

Do not invent a number to complete a graph.

PREVIEW

Explanation check

Does the graph show the same numbers as the table?

Are we comparing the same time?

What does the representation help us notice?

PREVIEW

Reflection

The table or graph helps me explain ____.

A limit of my record is ____.

PREVIEW

Well Done!

PREVIEW



Earth's Building Blocks

Lesson 07: Resources people use

PREVIEW



Learning focus

We can connect an Earth material's properties to a use.

We can explain how evidence helps people make decisions.

PREVIEW

Our starting question

Why might a gardener and a builder need different materials?
Which properties would matter for each purpose?

PREVIEW

Materials and purposes

People use rocks and minerals to make useful materials.

Some rocks serve as building stone. Minerals can supply materials for manufacturing.

Soil supports plant growth and provides space for roots.

Based on: Geoscience Australia, Australian mineral facts (ga.gov.au)

A fictional garden case

The class needs a planter for seedlings.

Sample A has visible plant pieces and crunchy grains.

Sample B is loose sand with no visible plant pieces.

These fictional clues guide a choice. They do not guarantee plant growth.

PREVIEW

Our practical task

Use C1 cards 4, 5 and 6 with a partner.

Match each purpose to a relevant property.

Compare two possible choices.

Ask what further information would help.

PREVIEW

Our evidence record

On W07, record the material, useful properties and reasons for your choice.

Use your sample observations where relevant.

Say whether your evidence is observed, sourced or fictional.

PREVIEW

Explanation check

Which evidence supports your recommendation?

Could the material have a drawback?

How might a gardener or homeowner test the material safely?

PREVIEW

Reflection

Scientific observations help people ____.

Our recommendation has a limit: ____.

PREVIEW

Well Done!

PREVIEW



Earth's Building Blocks

Lesson 08: Responsible choices

PREVIEW



Learning focus

We can compare the consequences of material choices.

We can use scientific evidence to help solve a practical problem.

PREVIEW

Our starting question

If a school needs a garden path, should it always buy new stone?

Which other information would help us decide?

PREVIEW

A fictional path problem

Option A: reuse sound stone already at school.

Option B: buy new quarried stone.

Both must meet the school's safety and access needs.

Inspect condition and suitability before recommending reuse.

PREVIEW

Resources and consequences

Extracting new material can disturb land and use energy.

Reusing suitable material can reduce the need for new extraction.

Rocks form over long timescales.

Our choice must also suit its purpose and safety needs.

PREVIEW

Our practical task

Compare options A and B using C1 card 7.

Identify a useful property and one consequence for each.

Discuss what information is missing.

No collection from protected or cultural places.

PREVIEW

Our evidence record

Use W08 to compare the fictional options.

Give a reasoned recommendation.

Prepare your earlier observation records for the assessment.

PREVIEW

Explanation check

Which option do you recommend, and under what conditions?

How does your evidence address the problem?

What might change your recommendation?

PREVIEW

Reflection

A responsible choice considers ____.

One missing fact I would check is ____.

PREVIEW

Well Done!

PREVIEW



Earth's Building Blocks

Lesson 04: Earth-material report

PREVIEW



Learning focus

We can compare properties and justify a resource choice.

We can communicate evidence for a decision to a younger class.

PREVIEW

Our starting question

Which observation from our portfolio is strongest?

Which label or unit would an audience need?

PREVIEW

A report model

Fictional example: “I recommend the crumbly soil for the planter.
It has visible organic matter and space between grains.
I would still check water movement and plant needs.”
The reason links a property to the purpose.

PREVIEW

Our assessment evidence

Include a rock/mineral/soil explanation.

Compare two materials using observations.

Add a labelled drawing, table or graph.

Justify a use and explain how to change a limit.

PREVIEW

Our practical task

Prepare your concise report using W09 and A1.
Use the evidence already gathered.
Explain to a partner before your teacher conference.
Speech, writing, drawing or a communication device can show
the same learning.

PREVIEW

Our evidence record

Identify the origin of each piece of evidence

Use actual class data, or clearly label the supposed fictional example.

Keep the sample conditions consistent.

PREVIEW

Explanation check

Which property supports your choice?

How was the comparison safe and consistent?

How does science help someone use this information?

PREVIEW

Reflection

One part of my explanation is well supported because ____.

One limit I will tell my audience is ____.

PREVIEW

PREVIEW

Well Done!



Earth's Building Blocks

Lesson 10: What else would we test

PREVIEW



Learning focus

We can state what our small sample set cannot show

We can suggest a safe next observation and revise an explanation.

PREVIEW

Our starting question

Does one jar tell us about every soil in Australia?

Which claim goes beyond our observations?

PREVIEW

Bounded conclusions

In our 12/20 mm example, B's layer is taller at 20 mm than at 12 mm.

"All soils like B are best for every plant" exceeds the evidence.

This is an illustrative model; actual class results may differ.

PREVIEW

A safe next question

We could compare another teacher-selected sample using the same method.

Or we could observe the same classrooms at a later labelled time.

More relevant evidence to improve an explanation.

A proposed research result.

PREVIEW

Our practical task

Use W10 to identify a limitation.

Propose one safe observation that addresses it.

State what you would keep alike.

Explain how the new evidence could affect your recommendation.

PREVIEW

Our evidence record

Add the limitation and next question to your assessment explanation.

Give a practical use for the finding.

The teacher completes the conference record for your portfolio and response.

PREVIEW

Explanation check

Why is your next observation useful?

Which finding might change your explanation?

Could a different soil sample give a different result?

PREVIEW

Reflection

I used to think _____. Now the evidence suggests _____.

I would investigate _____ safely.

PREVIEW

Well Done!

PREVIEW



PREVIEW

Earth's Building Blocks Year 3 Science Quiz



Quiz instructions

Think before explaining.

You may speak, point, draw, write or use a communication device.

Give evidence when the question asks for research.

Illustrative data and fictional cases are labelled.

PREVIEW

Question 1

Is soil just one kind of rock?

PREVIEW

Answer 1

No. Soil is a mixture. It can contain rock/mineral particles, organic matter, air and water.

PREVIEW

Question 2

Can colour alone reliably identify every mineral?

PREVIEW

Answer 2

No. Several properties help. We keep an unknown identity uncertain rather than guessing a name.

PREVIEW

Question 3

Quartz and granite: which is a mineral, and which is a rock?

PREVIEW

Based on: Geoscience Australia, Australian gems (ga.gov.au)

Answer 3

Quartz is a mineral. Granite is a rock that commonly contains several minerals.

PREVIEW

Based on: Geoscience Australia, Australian gems (ga.gov.au)

Question 4

Which is an observation: “this sample is rough” or “this sample must be granite”?

PREVIEW

Answer 4

“This sample is rough” describes an observation. A mineral
rock name needs more evidence.

PREVIEW

Question 5

One jar gets 25 mL soil and another gets 50 mL soil. What makes our comparison more consistent?

PREVIEW

Answer 5

Use the same soil volume, water volume, jars, mixing method, and observation times. Change only the selected soil sample.

PREVIEW

Question 6

Illustrative data at 10 minutes: $A = 12$ mm and $S = 20$ mm. Which layer is taller, and by how much?

PREVIEW

Answer 6

B is taller by 8 mm. This illustrative comparison describes length in terms of height. It does not establish the best unit for length.

PREVIEW

Question 7

Why can one jar not tell us about every soil?

PREVIEW

Answer 7

It represents only one selected sample under the method of observation time. Other samples and times may differ.

PREVIEW

Question 8

New fictional case: a school reuses sound stories for a month. Give a benefit and a check it still needs.

PREVIEW

Answer 8

Reuse can reduce demand for new extraction. Check the structure's condition and suitability for a safe, accessible path. Accept another reason linked to the stated cause.

PREVIEW

Question 9

New fictional case: a soil jar stays cloudy and no layer begins to form. What should you record, and what should you do next?

PREVIEW

Answer 9

Record “not clear” with the sample label and time. Keep the jar closed. Suggest a later timed observation on another teacher-prepared sample using the same method.

PREVIEW

Reflection

Which answer used your strongest evidence?

Which idea still needs another observation?

How could our explanation help someone choose a material?

PREVIEW

PREVIEW

Well Done!

